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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,810	09/25/2003	Michael J. Hennessy	HENN-2	7751

7590 02/26/2007
LEONARD COOPER
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EXAMINER

KAPLAN, HAL IRA

ART UNIT	PAPER NUMBER
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2836

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/670,810	Applicant(s) HENNESSY ET AL.	
	Examiner Hal I. Kaplan	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,7,9,16,18,20 and 21 is/are rejected.
- 7) ☒ Claim(s) 2,4,6,8,10-15,17 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by the US patent of Bowles (5,155,289).

As to claim 1, Rockot et al., drawn to a hybrid high direct current circuit interrupter, discloses a hybrid switch in a line (3,4), comprising: a first switching module (S1) for switching voltages and currents and incurring switching losses; and a second switching module (8,20) for conducting current and incurring conduction losses; said first and second modules (S1,8,20) being connected electrically in parallel, and respectively controllable to be in one of an open non-conducting state and a closed conducting state, at least one said module (8) having solid state construction (see column 3, lines 19-50 and Figure 2).

As to claim 3, the second module (8,20) comprises a thyristor (8) (see column 3, lines 26-28 and Figure 2).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2836

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 5, 16, 18, and 20 rejected under 35 U.S.C. 103(a) as being unpatentable over Rockot in view of the US patent of Gold et al. (5,953,224).

As to claims 5, 18, and 20, Rockot discloses all of the claimed features, as set forth above, except for at least one of the first module and the second module being cryogenically cooled. Gold, drawn to a control circuit for cryogenically-cooled power electronics employed in power conversion systems, teaches, in Figures 1-3, cryogenically cooling a switching circuit (see column 2, line 60 through column 3, line 4,

Art Unit: 2836

and column 8, lines 28-42). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to cryogenically cool the switches of Rockot, as taught by Gold, in order to enhance its electrical characteristics.

As to claim 16, Gold teaches the use of a refrigeration unit (18) cryogenically cooling at least one module (see column 6, lines 36-39).

7. Claims 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rockot in view of the US patent of Vercelloti et al. (5,774,000).

As to claims 7 and 21, Rockot teaches all of the claimed features, as set forth above, except for at least two second modules used for conducting currents connected in parallel, and at least another two second modules used for conducting currents connected in series. Vercelloti, drawn to a DC semiconductor switch, teaches, in Figure 6, a hybrid switch comprising two switching modules (68,20), wherein at least two second modules (20₁,20₂) used for conducting currents are connected in parallel (see column 4, lines 45-50; column 6, lines 45-51; column 6, line 66 through column 7, line 2; and column 7, lines 25-36). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to build the circuit of Rockot with two second modules connected in parallel, as taught by Vercelloti, in order to reduce the steady state power dissipation and provide backup in the event of failure of one of the second modules.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rockot in view of the US patent of Yamaguchi (5,828,112).

As to claim 9, Rockot teaches all of the claimed features, as set forth above,

Art Unit: 2836

except for at least two first modules used for switching voltages and currents connected in parallel. Yamaguchi, drawn to a semiconductor device incorporating an output element having a current-detecting section, teaches, in Figure 6, a hybrid switch comprising two switching modules (IGBT, DIODE, CURRENT DETECTING SECTION), wherein at least two first modules (IGBT, DIODE) used for switching voltages and currents are connected in parallel (see column 1, lines 52-57; column 8, lines 40-44; and Figure 6). It would have been obvious to one of ordinary skill in the art, at the time of the invention, to build the circuit of Rockot with two first modules connected in parallel, as taught by Yamaguchi, because it is conventional to design the switching circuit in this way.

Allowable Subject Matter

9. Claims 2, 4, 6, 8, 10-15, 17, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

11. Claims 2, 12-15, 17, and 19 contain allowable subject matter because none of the prior art of record discloses or suggests the claimed MOSFET, in combination with the remaining claimed features.

12. Claims 4, 6, and 11 contain allowable subject matter because none of the prior art of record discloses or suggests the claimed predetermined sequence and predetermined intervals, in combination with the remaining claimed features.

Art Unit: 2836

13. Claim 10 contains allowable subject matter because none of the prior art of record discloses or suggests the claimed first modules in series, in combination with the remaining claimed features.

Response to Arguments

14. Applicant's arguments with respect to claims 1, 3, 5, 7, 9, 16, 18, 20, and 21 have been considered but are moot in view of the new ground(s) of rejection.

15. Applicant's arguments, see Remarks, filed January 25, 2007, with respect to the rejections of claims 2, 4, 6, 8, 10-15, 17, and 19 have been fully considered and are persuasive. The rejections of claims 2, 4, 6, 8, 10-15, 17, and 19 have been withdrawn.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hal I. Kaplan whose telephone number is 571-272-8587. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2836

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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